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Elastic Tank for Vehicles

The elastic tank is provided with elastic connection nozzles so that it can then be installed in a take-up space equal to the perimeter of the tank. These connection nozzles are located in a recessed position inside the tank during the installation process and after installation are inverted into corresponding openings in the take up space. They constitute a sealing element for connection parts of vehicle lines to the tank and further serve to seal the take-up spaces against the openings and to attach the tank to the take-up space. (3210 332)

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[1] *Translator's note: An "Offenlegungsschrift" is unexamined and issued for publication only.*

Patent Claims

1. An elastic tank for vehicles, in particular for armored vehicles, wherein the tank is held in a vehicle structural support frame consisting of walls, said walls comprising openings to insert one or more connection nozzles for fuel lines and the like to fill and empty and to aerate and ventilate the tank, and wherein the connection nozzle is solidly connected to a tank wall, characterized in that the connection nozzle (11, 12, 13, 16, 18) comprises a collar (19) with an outer flange (21) and an inner flange (22), said collar being designed as an inverting element and capable of being pulled into the openings (10, 14, 15, 17; 20) of the wall (8) from the inside of the tank for installation in the take-up space (4) constituted by the walls (8) of the vehicle structure (1) or the armored well in such a way that the outer flange (21) overlaps an edge of the openings (24) of the wall (8) and encloses take-up space (4) of the tank(5) with fluid sealing effect.

2. An elastic tank according to Claim 1, characterized in that the two flanges (21, 22) of the collar (19) overlap and grasp the edges of the openings (24, 25) of the wall (8) of the take-up space (4).

3. An elastic tank according to Claims 1 or 2, characterized in that the collar (19) is placed in the openings (10, 14, 15, 17, 20) of the wall (8) with a radial play (*a*).

4. An elastic tank according to Claims 1, 2 or 3, characterized in that the outer flange (21) of the collar (19) comprises a protruding seal ring (27; 27') that extends into a corresponding groove (28) in the wall(8) or into a groove (28') of a connection element (29; 29') placed onto the flange (21).

5. An elastic tank according to Claim 1, characterized in that the wall (9) of the tank (5) is connected to the inner flange (22) of the collar (19) via vulcanization or adhesion.

6. An elastic tank according to Claim 1, characterized in that the inner flange (22) is designed to extend outward in a wedge shape and that the tank wall (9)runs continuously toward the opening (10, 14, 15, 17; 20).

7. An elastic tank according to Claims 5 or 6, characterized in that the tank wall (9) is located between the inner flange (22) of the collar (19) and the wall (8).

8. An elastic tank according to Claims 5 or 6, characterized in that the tank wall (9) is placed against the outer surface of the inner flange (22).

9. An elastic tank according to Claim 1, characterized in that at least one connection nozzle is located in the corner area of the tank (5) and that an inner flange section (22′) runs parallel with the tubular collar section (23) near a horizontal wall of the take-up space(4) and another inner flange section(22'') overlaps the edge of the opening (25) near the perpendicular wall of the space (4)(Fig. 5).

Elastic Tank for Vehicles

The invention pertains to an elastic tank for vehicles according to the preamble of Claim 1.

There exists a known elastic fuel tank for vehicles (DE-OS 20 49 405), which comprises an integral, protruding fill nozzle. The disadvantage to this design is that the tank can only be installed in a space that has enough freedom to thread the nozzle protruding from the tank to its receiving opening in a structural wall of the vehicle. Since the walls of the armored well that defines the take-up space lie directly adjacent to the tank, a tank having one or more protruding nozzles at multiple places is difficult at best to install.

The objective of the invention is to create an elastic tank with connection nozzles, said tank being installable in a simple manner in a take-up space occupied by the tank. In the process, however, the nozzles of the tank should be designed and located in such a manner that the take-up space defined by the walls is sealed. Further, the nozzles should serve as sealing elements for other connection elements to be connected to the nozzles and should ensure a means to attach the tank and provide tolerancing adjustment. Furthermore, by specifically arranging the nozzles at the bottom of the tank, it should be possible to simplify the process to allow complete draining of the tank contents.

This task is accomplished according to the invention by the features of Claim 1. Other advantageous features are contained in the dependent claims.

The particular advantages accomplished with the invention are that an elastic tank having multiple connection nozzles can be installed in a simple manner in a tightly enclosed space. The nozzles are connected to the tank via a flange, and extend into the tank interior during installation. The advantage to this is that there are no protruding elements that prevent the tank from being pushed into the take-up space. After the tank is pushed in, the nozzles are pulled to a position adjacent to the outer wall by inverting it inside out into the receiving openings so that a fluid seal of the take-up space is achieved. The elastic design of the nozzles further allows the tank to be fixed in place and provides tolerancing allowances. Also, when other equipment is attached to the connection nozzles via a seal ring that is integral to the nozzle, a fluid-seal connection of lines and the like can be ensured. Also, the nozzles equipped with the flanges creates the ability to form the inner flange such that an outflow opening in the side wall can be accomplished that runs even with the horizontal floor level of the tank; this allows unhindered outflow of fuel without having to make further penetrations in the tank floor.

Exemplary embodiments of the invention are illustrated in the drawing described and are described in more detail below. Shown are

Fig. 1 a top view of the side of a tank vehicle travelling to the right with an elastic tank located in the well in the area above the track,

Fig. 2 A section according to line II-II in Fig. 1,

Fig. 3 A vertical section through a fill opening in the tank,

Fig. 4 A vertical section through a floor drain opening in the tank, and

Fig. 5 Another embodiment of a drain opening in the rear area of the tank.

Depicted above each of the tracks 2 in an armored vehicle in a well 3 are respective take-up spaces 4 for fuel tanks 5. These are design to be elastic and are inserted through a rear installation opening 6 in the take-up space of the well 3. Take-up space 4 is constituted by walls 8 of the well 3 which surround the tank in such a manner that the tank walls 9 lie against the walls 8 of the well 3.

To fill with fuel, a connection nozzle 11 is provided in the upper wall of the tank 5 in an opening 10. Fuel is withdrawn via connection nozzles 12 and 13 in openings 14 and 15 in a side wall of the tank 5 and through another connection nozzle 16 in an opening 17 in the floor of the tank 5. According to another embodiment according to Fig. 5, there can also be just two connection nozzles 18 located in a perpendicular side wall of the tank 5. This is the case when there are no floor openings provided. The connection nozzle 18 runs along the length of the tank floor so that a continuous discharge of fuel is ensured.

Connection nozzles 11, 12, 13, 16 and 18 are preferred to consist of an elastic material and are designed as collars 19. They each comprise an inner flange 21, which is formed radially outward, and an outer flange 22.

A tubular collar section 23 forms a connection between the two flanges. Through vulcanization or an adhesion process, the inner flange 21 is connected to the tank wall 9.

To install the tank 5 in the take-up space 4 of the well 3, the collars 19 are inverted into the tank interior (installed position A). The tubular collar section 23 and the flange 21 assume a position within the tank as is shown in Fig. 5 with dashed-dotted lines. After the tank 3 has assumed its final installed position B in space 4, the collars 19 are pulled outward in the direction of the arrow into the corresponding openings of the well walls. Flanges 21 and 22 of the collar 19 overlap the outer edge of the openings 24 and the inner edge of the openings 25 of the wall 8, respectively, wherein the outer flange 21 lies against the wall 8 in a liquid seal. The collar produces an installed state B with a sealed closure of the tank take-up space 4 near the openings so that when there is a leak in the tank 5 no fuel can flow out. The outer flange 21 of the collar 19 is provided with a protruding seal ring 27. This seal ring extends into a corresponding groove 28 in a connection element 29 placed on the flange 21 and connected to the wall 8 and strengthens the sealing effect between the collar 19 and the wall 8. A fuel line is connected to the connection element 29 in the usual fashion. According to another exemplary embodiment of the collar 19 (Fig. 3) a seal ring 27' can also extend into a corresponding groove 28' in the wall 8. A connection piece 29' is then provided with a flange seat in which it is placed with sealing effect. The tubular collar section 23 that connects the flanges 21 and 22 is preferred to be held with radial play *a* in the openings of the wall 8. Play *a* is accomplished by means of a conical opening that expands in the direction of the tank interior.

To connect to the flange 22 of the collar 19, the tank wall 9 can be placed against the outside or between the flange 22 and the wall of the well 8. The flange is designed to have a wedge-shaped profile so that a smooth transition from the tank wall 9 to the opening is guaranteed.

According to the exemplary embodiment according to Fig. 5, the collar 19 is located in the corner area of the take-up space 4 and in the corner area of the tank 5. This requires an inner flange 22 with flange sections 22′ and 22′′ that are perpendicular with respect to one another. One flange section 22′ overlaps the wall 8 in the manner described above. The other flange section 22′′ runs approximately in the same horizontal plane 30 as the tubular collar section 23.

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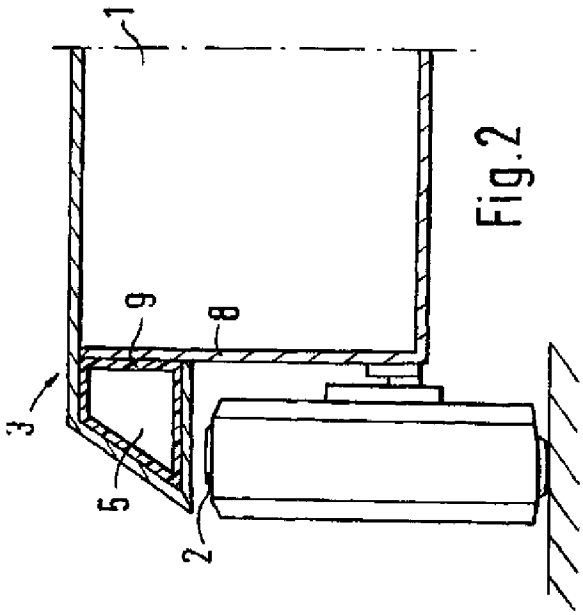

Fig.2

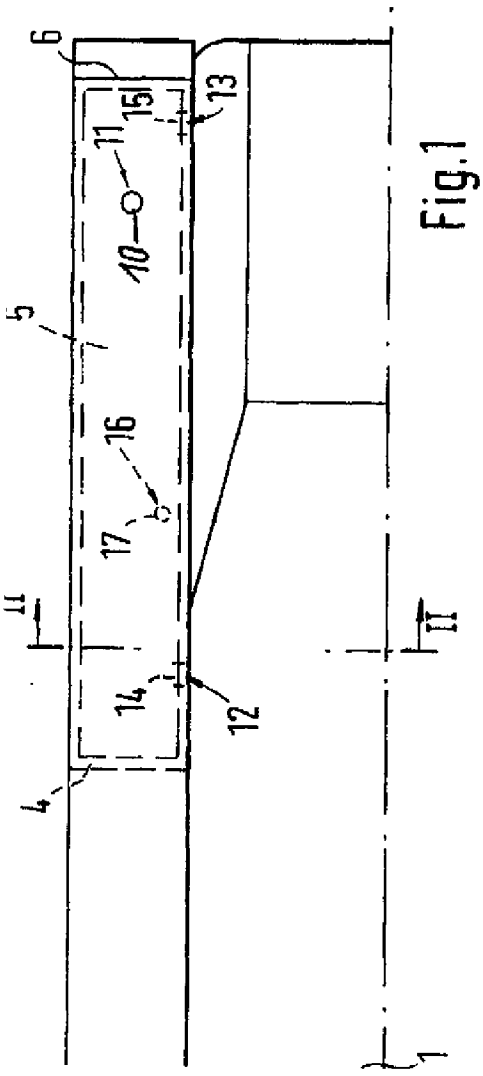

Fig.1

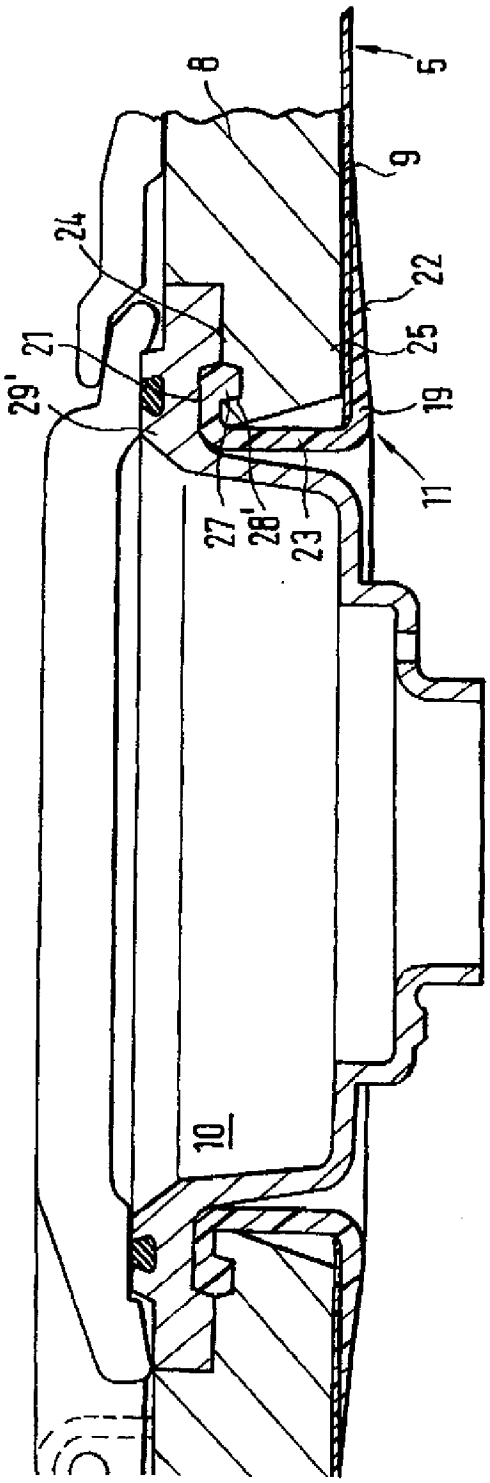

Fig.3

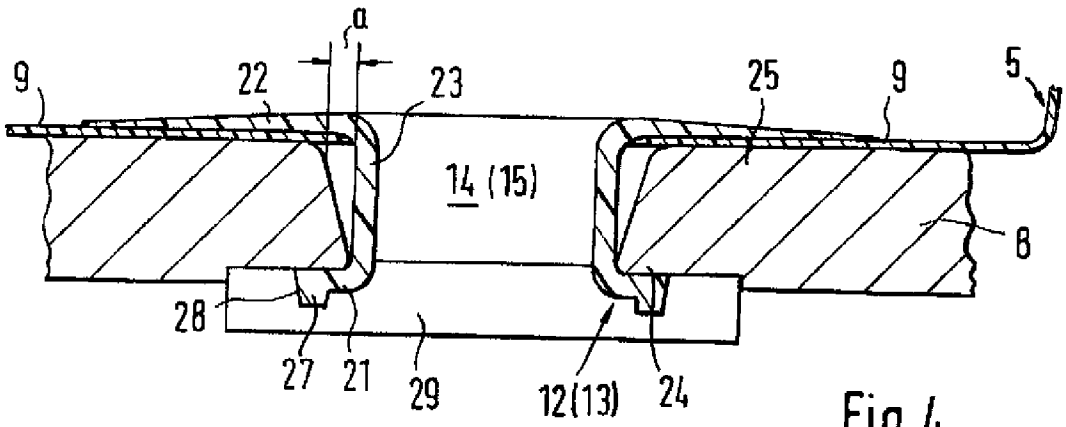
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Fig. 4

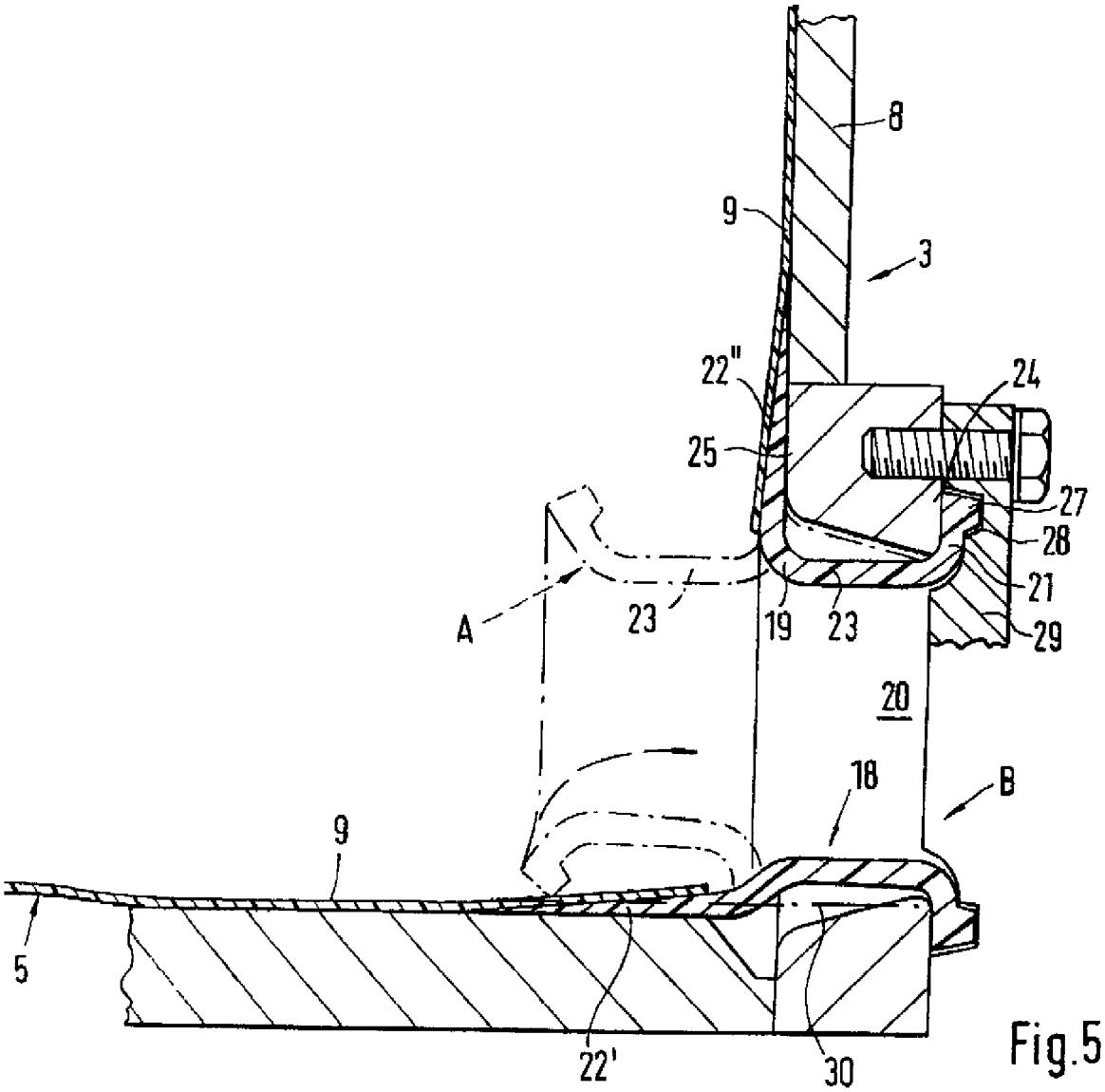
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Fig. 5